Development of a Stem Cell Therapy to Promote Functional Recovery in Stroke

Grant Award Details

Development of a Stem Cell Therapy to Promote Functional Recovery in Stroke

Grant Type: Disease Team Planning

Grant Number: DT1-00669

Investigator:

Name:	Stanley Carmichael
Institution:	University of California, Los Angeles
Type:	PI

Award Value: $42,748

Status: Closed

Grant Application Details

Application Title: Development of a Stem Cell Therapy to Promote Functional Recovery in Stroke

Public Abstract:	Stroke is the leading cause of adult disability. As Californians adopt health measures that minimize stroke risk factors, such as high blood pressure and smoking, the number one risk factor for stroke cannot be controlled: age. As the population ages the incidence of stroke is expected to markedly increase to almost 1.2 million cases per year in the United States, with a disproportionate increase in stroke in California with its relative population growth in older age groups. Because most of the cost in stroke is in the chronic care of disabled survivors, studies indicate that this increase in stroke incidence may cause the total cost of caring for stroke victims in the next quarter century in the United States to top $1 trillion dollars. Stroke induces a limited degree of functional recovery. In humans, this recovery is associated with functional re-organization of the tissue adjacent to the stroke site. Recent studies have shown that stem cell transplantation enhances functional recovery in animal models of stroke. However, these stem cell therapies in animal models of stroke have not translated into new clinical therapies for several important reasons. First, most studies have transplanted stem cells into normal brain that is adjacent to the stroke site. Because cell transplantation produces a degree of damage, this approach disrupts the very brain tissue that participates in normal functional recovery in humans. Second, most of the transplanted cells die after transplantation, a process termed “transplant shock”. Third, the mechanisms of recovery in experimental animal models of stroke, such as mice, have been difficult to generalize to the larger and more complex human brain. This grant assembles a team of clinicians and basic scientists that will apply emerging biomedical technologies to transplant stem cells directly into the stroke tissue and not normal brain, enhance the survival of these cells, and measure their effects on functional recovery using behavioral tests and advanced brain imaging modalities that can be applied to human stroke stem cell trials. This team involves scientists that range from bioengineers, stem cell and neuro-biologists to neurosurgeons and stroke and neurorehabilitation clinicians. The team is organized to facilitate communication among these disciplines so that its novel technologies, such as an injectable biological matrix that promotes stem cell survival, are developed in a clinically relevant way for application to human therapies at the completion of the grant period. Stroke takes up to one-third of patients from independence to a nursing home or other institution and renders over one-half of patients unable to walk without assistance. This grant focuses on the development of a clinically ready stem cell therapy to promote recovery in this devastating disease.
Statement of Benefit to California:	The proposed research will identify a treatment that promotes functional recovery after stroke. Stroke is the leading cause of adult disability. There are no current treatments that stimulate brain repair and recovery in this disease. The research in this grant will assemble a team and a treatment process that uses new technologies to develop a stem cell-based therapy for neural repair after stroke.